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Aponogetonaceae, Juncaginaceae, Alismaceae, Butomaceae, and Hydrocharidaceae. From an investigation of adult structure and manner of development, he has concluded that the axillary scales found at the bases of the leaves in the plants of these genera are homologous with the more specialized and solitary stipules of Selaginella and Isoetes. It will be recalled that GIBSON regards the ligule as a sort of specialized ramentum, protecting and keeping moist the young leaves and growing apex of Selaginella and Isoetes.—FLORENCE LYON.

**Reserve food of trees.**—NIKLEWSKI<sup>24</sup> confirms by macrochemical methods the observation of Russow and of FISCHER, that in winter the fat-content of trees first increases and then diminishes. The process cannot be reversed by temperature changes. While a rise of temperature accelerates the formation of fat, no change affects its solution. The transformation of fat and of starch are not related. Low temperatures promote the formation of sugar from starch. Complex phenomena result from a rise of temperature. So great is the loss of reserves by the increased respiration, that it seems probable that bodies other than starch or fat share in the metabolism and give rise to carbohydrates.—C. R. B.

**Conjugation of yeasts.**—GUILLIERMOND<sup>25</sup> has extended his studies on the conjugation of yeasts to several additional forms of the Schizosaccharomyces and Zygosaccharomyces. The union of the cells is followed by the fusion of the two nuclei, after which the fusion nucleus divides and the two cells separate or spores are formed in the fusion cell. In some forms conjugation takes place with the germination of the spores. GUILLIERMOND regards this cell and nuclear fusion as a sexual act, but of course chiefly on physiological grounds. Since we do not know the history of the yeasts, it is a matter of speculation whether or not these conjugating cells are phylogenetically gametes.—B. M. DAVIS.

**Amphispores in Uredineae.**—ARTHUR has given an account of all species of rusts which have amphispores,<sup>26</sup> *i. e.*, as defined by CARLETON, one-celled spores which resemble the teleutospores of Uromyces in appearance, but have two or more germ-pores, and in germination behave like uredospores, their function seeming to be to tide the fungus over unfavorable conditions. This account includes one species of Uromyces and eight of Puccinia, one of which, *P. Garrettii*, is new. All the forms are American, for thus far no cases of the occurrence of amphispores have been reported from other parts of the world.—H. HASSELBRING.

**Photosynthesis extra vitam.**—BERNARD has again examined carefully the

<sup>24</sup> NIKLEWSKI, B., Untersuchungen über die Umwandlung einiger stickstoffreier Reservestoffe während der Winterperiode der Bäume. Beihefte Bot. Centralbl. **19**: 68-117. 1905.

<sup>25</sup> GUILLIERMOND, M. A., Recherches sur la germination des spores et la conjugaison chez les lécumes. Rev. Gén. Bot. **17**: 337-376. pls. 6-9. figs. 11. 1905.

<sup>26</sup> ARTHUR, J. C., Amphispores of the grass and sedge rusts. Bull. Torr. Bot. Club **32**: 35-42. figs. 9. 1905.